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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
MUHAMMED, ABDUKADER S	
ART UNIT	PAPER NUMBER
2627	

SHORTENED STATUTORY PERIOD OF RESPONSE	NOTIFICATION DATE	DELIVERY MODE
3 MONTHS	04/18/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Notice of this Office communication was sent electronically on the above-indicated "Notification Date" and has a shortened statutory period for reply of 3 MONTHS from 04/18/2007.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)
	10/786,554	TAKEHARA, SHINTARO
	Examiner	Art Unit
	Abdukader Muhammed	2627

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 26 February 2004.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-16 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-16 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-6, 8-14, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishibashi et al. (US 5,808,979).

Regarding Claim 1, Ishibashi et al. teach a disk apparatus for reproducing a disk on which information is recorded by pits or marks with various lengths (long and short marks; see column 1, lines 54-57), comprising: a photodetection unit configured to divisionally detect light reflected by the disk as a plurality of photodetection signals (four photodetector elements 1a, 1b, 1c, and 1d; see figure 1); and a tracking error signal generation unit configured to generate a tracking error signal on the basis of a phase difference between the plurality of photo-detection signals detected by the photodetection unit (see field of the invention section in column 1, lines 5-13), wherein the tracking error signal generation unit includes: an equalization unit configured to equalize waveforms of the plurality of photodetection signals detected by the photodetection unit,(discrete boost filters of the phase lead type having identical characteristics for the output signal from two pairs of diagonally located photodetector elements ; see figure 2A and column 2,

lines 11). Ishibashi et al. does not distinctly disclose the equalization unit has a gain of not less than 15 dB at a frequency corresponding to a shortest pit or mark.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to adjust the gain of the equalization unit to be not less than 15 dB after routine experiment to discover the optimum range since Ishibashi et al. disclose the general condition as phase lead filter is used as the boost filter for high frequency (signals of high frequency are from short pits; see column 6, lines 45-47) is with a high 20 dB/dec boost characteristic (see column 7, lines 27-33).

Regarding Claim 2, as applied to claim 1 above, but Ishibashi et al. does not distinctly disclose the equalization unit has frequency-gain characteristics that obtain a gain of not more than -3 dB at a frequency three times the frequency corresponding to the shortest pit or mark.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to adjust the gain of the equalization unit to be not more than -3 dB at a frequency three times the frequency corresponding to the shortest pit or mark after routine experiment to discover the optimum range since Ishibashi et al. disclose the general condition as for higher frequencies the gain drops naturally due to the signal bandpass characteristics of the buffer amplifier (see column 8, lines 5-7).

Regarding Claim 3, as applied to claim 1 above, Ishibashi et al. also teach the equalization unit includes: a high-pass filter (high pass filters 4a and 4b; see figures 1 and 2A) having frequency-gain characteristics in which a gain is constant within a first frequency range not more than a first frequency, a gain is constant within a second frequency range not less than a second frequency which is more than the first frequency, and a gain increases in a third

frequency band between the first and second frequencies (see figure 2B and also note that this a general characteristic of high pass filters), and a low-pass filter (low pass filters 6a and 6b; see figures 1 and 2A) having frequency-gain characteristics in which a gain attenuates within a fourth frequency band not less than a third frequency (see figure 2B and also note that this a general characteristic of low pass filters).

Regarding Claim 4, as applied to claim 2 above, Ishibashi et al. also teach the equalization unit includes: a high-pass filter (high pass filters 4a and 4b; see figures 1 and 2A) having frequency-gain characteristics in which a gain is constant within a first frequency range not more than a first frequency, a gain is constant within a second frequency range not less than a second frequency which is more than the first frequency, and a gain increases in a third frequency band between the first and second frequencies (see figure 2B and also note that this a general characteristic of high pass filters), and a low-pass filter (low pass filters 6a and 6b; see figures 1 and 2A) having frequency-gain characteristics in which a gain attenuates within a fourth frequency band not less than a third frequency (see figure 2B and also note that this a general characteristic of low pass filters).

Regarding Claim 5, as applied to claim 4 above, Ishibashi et al. also teach the first frequency range is a frequency range 0.5 to 1.5 times a frequency corresponding to a pit or mark with which a reproduction signal amplitude saturates (from page 14, line 1 Fs=3.99 MHz, hence the first frequency range is 2-6 MHz. Ishibashi et al. use 5 MHz as the starting point of gain increase; see column 8, lines 1-2 and figure 2B), the second frequency range is a frequency range 0.5 to 1.5 times the frequency corresponding to the shortest pit or mark (from page 14, line 1 Fmax=16 MHz, hence the first frequency range is 8-24 MHz. Ishibashi et al. use 20 MHz as the

starting point of constant gain; see column 8, lines 4-5 and figure 2B), the third frequency matches the frequency corresponding to the shortest pit or mark that is Fmax=16 MHz (this frequency area is between the two points as shown in figure 2B). But Ishibashi et al. does not specifically disclose a Q value of the low-pass filter is not less than 2.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to adjust the Q factor to be greater than 2 after routine experiment to discover the optimum range since Ishibashi et al. disclose the general condition for the filters frequencies as shown above. Q factor is also a mere mathematical expression that depends on variables like frequency, resistance and capacitance of the filter.

Regarding Claim 6, as applied to claim 1 above, but Ishibashi et al. does not specifically disclose that the transfer function H of the equalization unit as given in the claim.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to formulate the transfer function as shown in the claim since it is merely a mathematical expression of the characteristics of the filters.

Regarding Claim 8, as applied to claim 1 above, Ishibashi et al. also teach that the gain at the frequency corresponding to the shortest pit or mark is not less than 0. the frequency corresponding to the shortest pit or mark is Fmax (as shown in page 7, lines 14-15 of the instant invention) and F_{max}=16 MHz (as shown in page 14, line 1 of the instant invention). Ishibashi et al. disclose that between f_5=5 MHz and f_6=20 MHz (see column 8, lines1-4) the gain is greater than 0 as shown in figure 2B.

Regarding Claim 9, Ishibashi et al. teach an information processing method for processing a signal read out from a disk on which information is recorded by pits or marks with

various lengths (long and short marks; see column 1, lines 54-57), comprising: divisionally detecting light reflected by the disk as a plurality of photodetection signals (detecting from four photodetector elements 1a, 1b, 1c, and 1d; see figure 1); equalizing waveforms of the plurality of detected photodetection signals by an equalizer (equalizing using discrete boost filters of the phase lead type having identical characteristics for the output signal from two pairs of diagonally located photodetector elements ; see figure 2A and column 2, lines 11); and generating a tracking error signal on the basis of a phase difference between the plurality of equalized signals (see field of the invention section in column 1, lines 5-13). Ishibashi et al. does not distinctly disclose the equalization unit has a gain of not less than 15 dB at a frequency corresponding to a shortest pit or mark.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to adjust the gain of the equalization unit to be not less than 15 dB after routine experiment to discover the optimum range since Ishibashi et al. disclose the general condition as phase lead filter is used as the boost filter for high frequency (signals of high frequency are from short pits; see column 6, lines 45-47) is with a high 20 dB/dec boost characteristic (see column 7, lines 27-33).

Regarding Claim 10, as applied to claim 9 above, but Ishibashi et al. does not distinctly disclose the equalization unit has frequency-gain characteristics that obtain a gain of not more than -3 dB at a frequency three times the frequency corresponding to the shortest pit or mark.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to adjust the gain of the equalization unit to be not more than -3 dB at a frequency three times the frequency corresponding to the shortest pit or mark after routine experiment to

discover the optimum range since Ishibashi et al. disclose the general condition as for higher frequencies the gain drops naturally due to the signal bandpass characteristics of the buffer amplifier (see column 8, lines 5-7).

Regarding Claim 11, as applied to claim 9 above, Ishibashi et al. also teach the equalization unit includes: a high-pass filter (high pass filters 4a and 4b; see figures 1 and 2A) having frequency-gain characteristics in which a gain is constant within a first frequency range not more than a first frequency, a gain is constant within a second frequency range not less than a second frequency which is more than the first frequency, and a gain increases in a third frequency band between the first and second frequencies (see figure 2B and also note that this a general characteristic of high pass filters), and a low-pass filter (low pass filters 6a and 6b; see figures 1 and 2A) having frequency-gain characteristics in which a gain attenuates within a fourth frequency band not less than a third frequency (see figure 2B and also note that this a general characteristic of low pass filters).

Regarding Claim 12, as applied to claim 10 above, Ishibashi et al. also teach the equalization unit includes: a high-pass filter (high pass filters 4a and 4b; see figures 1 and 2A) having frequency-gain characteristics in which a gain is constant within a first frequency range not more than a first frequency, a gain is constant within a second frequency range not less than a second frequency which is more than the first frequency, and a gain increases in a third frequency band between the first and second frequencies (see figure 2B and also note that this a general characteristic of high pass filters), and a low-pass filter (low pass filters 6a and 6b; see figures 1 and 2A) having frequency-gain characteristics in which a gain attenuates within a

fourth frequency band not less than a third frequency (see figure 2B and also note that this a general characteristic of low pass filters).

Regarding Claim 13, as applied to claim 12 above, Ishibashi et al. also teach the first frequency range is a frequency range 0.5 to 1.5 times a frequency corresponding to a pit or mark with which a reproduction signal amplitude saturates (from page 14, line 1 Fs=3.99 MHz, hence the first frequency range is 2-6 MHz. Ishibashi et al. use 5 MHz as the starting point of gain increase; see column 8, lines 1-2 and figure 2B), the second frequency range is a frequency range 0.5 to 1.5 times the frequency corresponding to the shortest pit or mark (from page 14, line 1 Fmax=16 MHz, hence the first frequency range is 8-24 MHz. Ishibashi et al. use 20 MHz as the starting point of constant gain; see column 8, lines 4-5 and figure 2B), the third frequency matches the frequency corresponding to the shortest pit or mark that is Fmax=16 MHz (this frequency area is between the two points as shown in figure 2B). But Ishibashi et al. does not specifically disclose a Q value of the low-pass filter is not less than 2.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to adjust the Q factor to be greater than 2 after routine experiment to discover the optimum range since Ishibashi et al. disclose the general condition for the filters frequencies as shown above. Q factor is also a mere mathematical expression that depends on variables like frequency, resistance and capacitance of the filter.

Regarding Claim 14, as applied to claim 9 above, but Ishibashi et al. does not specifically disclose that the transfer function H of the equalization unit as given in the claim.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to formulate the transfer function as shown in the claim since it is merely a mathematical expression of the characteristics of the filters.

Regarding Claim 16, as applied to claim 1 above, Ishibashi et al. also teach that the gain at the frequency corresponding to the shortest pit or mark is not less than 0. the frequency corresponding to the shortest pit or mark is Fmax (as shown in page 7, lines 14-15 of the instant invention) and F_{max}=16 MHz (as shown in page 14, line 1 of the instant invention). Ishibashi et al. disclose that between f_5=5 MHz and f_6=20 MHz (see column 8, lines1-4) the gain is greater than 0 as shown in figure 2B.

4. Claims 7 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishibashi et al. (US 5,808,979) as applied to claims 5 and 13, above, further in view of Nobukuni et al. (US Publication 2001/0053115 A1).

Regarding Claim 7, Ishibashi et al. teach the limitations of claim 5 for the reasons discussed above. Ishibashi et al. differ from the claimed invention in that it does not specifically show the ratio of the shortest pit to the pit or mark for which the reproduction signal amplitude saturates is 2:8.

Nobukuni et al. on the other hand teach (1, 7) RLL-NRZI modulation with a mark length of 2T for short pits and 8T for long pits (see page 1, paragraph [0015], lines 9-10). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used RLL 91, 7) modulation for high density disks since Nobukuni et al. teach that the (1, 7) RLL - NRZI modulation are known as modulation methods for high-density mark length modulation recording (see page 1, paragraph [0015], lines 10-12).

Regarding Claim 15, Ishibashi et al. teach the limitations of claim 13 for the reasons discussed above. Ishibashi et al. differ from the claimed invention in that it does not specifically show the ratio of the shortest pit to the pit or mark for which the reproduction signal amplitude saturates is 2:8.

Nobukuni et al. on the other hand teach (1, 7) RLL-NRZI modulation with a mark length of 2T for short pits and 8T for long pits (see page 1, paragraph [0015], lines 9-10). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used RLL 91, 7) modulation for high density disks since Nobukuni et al. teach that the (1, 7) RLL - NRZI modulation are known as modulation methods for high-density mark length modulation recording (see page 1, paragraph [0015], lines 10-12).

Conclusion

5. The prior art made of record in PTO-892 Form and not relied upon is considered pertinent to applicant's disclosure.

Ma et al. (US 7102967 B1) teach a method and apparatus for tracking error detection in an optical disk reproduction system. The tracking error detecting apparatus generates a tracking error signal as a difference signal of optical detection signals generated by more than two optical detectors positioned along a diagonal line from a track center and includes binarizers, phase locked loops (PLLs), a phase difference detector, and low-pass filters which filter the output of the phase difference detector to output the result as the tracking error signal (see figure 3).

Kitahara (US 6304530 B1) teaches an apparatus for tracking error detection in an optical disk reproduction system. The tracking error detecting apparatus generates a tracking error signal as a difference signal of optical detection signals generated by four optical detectors and includes

waveform equalizers, waveform shapers, phase comparators, and low-pass filters which filter the output of the phase difference detector to output the result as the tracking error signal (see figure 6).

Nomoto (US 6937547 B2) teaches a system for detecting a tracking error comprising a four-divided type light detectors, low pass filters, first and second waveform generator, and a phase comparator (see figure 4).

Tanaka et al. (US 4785441) teach an optical information reproducing apparatus having a phase difference tracking system. The photodetector comprises first through fourth photocells which are respectively disposed at first through fourth quadrants defined by a first straight line parallel to an information track image and a second straight line perpendicular to the first straight line. A phase comparator produces a tracking error signal from a phase difference between output signals of the first and second adders (see figures 3 and 4).

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Abdukader Muhammed whose telephone number is (571) 270-1226. The examiner can normally be reached on Monday-Thursday 8:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wayne Young can be reached on (571) 272-7582. Customer Service can be reached at (571) 272-2600. The fax number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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03 April 2007

WAYNE YOUNG
SUPERVISORY PATENT EXAMINER